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Robert Baumann

College of the Holy Cross, rbaumann@holycross.edu

Bryan Engelhardt

College of the Holy Cross, bengelha@holycross.edu

Victor Matheson

College of the Holy Cross, vmatheso@holycross.edu

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Recommended Citation

Baumann, Robert; Engelhardt, Bryan; and Matheson, Victor, "The Great Macroeconomic Experiment: Assessing the Effects of Fiscal Stimulus Spending on Employment Growth" (2009). *Economics Department Working Papers*. Paper 33.

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July 2009

Revised August 2009

COLLEGE OF THE HOLY CROSS, DEPARTMENT OF ECONOMICS
FACULTY RESEARCH SERIES, PAPER NO. 09-10*



Department of Economics
College of the Holy Cross
Box 45A
Worcester, Massachusetts 01610
(508) 793-3362 (phone)
(508) 793-3708 (fax)

<http://www.holycross.edu/departments/economics/website>

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The Great Macroeconomic Experiment: Assessing the Effects of Fiscal Spending on Employment Growth

By
Robert Baumann[†] Bryan Englehardt^{††}
College of the Holy Cross College of the Holy Cross
and
Victor A. Matheson^{†††}
College of the Holy Cross

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Abstract

As the economics profession is split over the expected impact of the American Recovery and Reinvestment Act of 2009, we analyze the effects as if it were an experiment. Specifically, we analyze the effects of spending on employment using an instrumental variable difference-in-difference approach by state. To date, we find spending has no significant effect on employment.

JEL Classification Codes: E12, E13, E32, E62

Keywords: fiscal policy, economic stimulus, unemployment, jobs

[†]Robert Baumann, Department of Economics, Box 192A, College of the Holy Cross, Worcester, MA 01610-2395, 508-793-3879 (phone), 508-793-3708 (fax), rbaumann@holycross.edu

^{††}Bryan Engelhardt, Department of Economics, Box 219A, College of the Holy Cross, Worcester, MA 01610-2395, 508-793-3669 (phone), 508-793-3708 (fax), bengelha@holycross.edu

^{†††}Victor A. Matheson, Department of Economics, Box 157A, College of the Holy Cross, Worcester, MA 01610-2395, 508-793-2649 (phone), 508-793-3708 (fax), vmatheso@holycross.edu

Introduction

The “Great Recession” of 2007-present has brought the efficacy of fiscal policy to smooth recessions into the center of public debate and has highlighted the state of macroeconomic theory. In particular, it has brought to the forefront, again, how macroeconomists cannot agree on how to predict the effects of large changes in fiscal policy. The main reason we cannot agree is that macroeconomic models capable of predicting the counterfactual results are extremely sensitive to their underlying assumptions. Furthermore, we have carefully observed very few, if any, *large* deviations in fiscal spending that would be necessary to test the different models’ predictions. Even the well-known New Deal programs enacted during the Great Depression such as the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC) resulted in very small fiscal expenditures as measured as percent of GDP. As a result, American Recovery and Reinvestment Act of 2009, which authorized \$787 billion in fiscal stimulus money, is one of the largest macroeconomic experiments ever run.

It is worth highlighting the current division in macroeconomic theory. Prior to the current recession, it is probably fair to say that the majority of economists would have seen little need for active fiscal policy (outside of automatic stabilizers such as income taxes and unemployment insurance) for the management of the business cycle. Since at least the 1980s, prudent monetary policy had seemed sufficient to reduce both the frequency and severity of recessions in the United States and had arguably brought about the “Great Moderation,” a significant reduction in volatility of the business cycle.

However, faced with record job losses, collapsing housing prices, a deeply struggling financial system, and a Federal Reserve system entering uncharted territory with nominal interest

rates effectively set equal to zero percent, by early 2009, a strong bi-partisan coalition of economists began supporting the passage of a major fiscal stimulus package. Proponents of an active fiscal stimulus included Mark Zandi, and economic advisor to the McCain campaign, Nobel Laureates Paul Krugman and Joseph Stiglitz, Martin Feldstein, head the National Bureau of Economic Research's recession dating committee and an advisor to Ronald Reagan, and J. Bradford DeLong - Berkley economist and Deputy Assistant Treasury Secretary during the Clinton Administration. Indeed, the phrase "we're all Keynesians now" became a common refrain.

In response to this vocal chorus of calls for a stimulus package, the CATO institute published a statement against such a policy reading:

Notwithstanding reports that all economists are now Keynesians and that we all support a big increase in the burden of government, we do not believe that more government spending is a way to improve economic performance. More government spending by Hoover and Roosevelt did not pull the United States economy out of the Great Depression in the 1930s. More government spending did not solve Japan's "lost decade" in the 1990s. As such, it is a triumph of hope over experience to believe that more government spending will help the U.S. today. To improve the economy, policy makers should focus on reforms that remove impediments to work, saving, investment and production. Lower tax rates and a reduction in the burden of government are the best ways of using fiscal policy to boost growth. (CATO Institute, 2009)

The statement was signed by over 200 economists included Nobel Laureates Edward Prescott, Vernon Smith, and James Buchanan. They were joined by other notable critics including John Taylor, Stanford University and Undersecretary of the Treasury under George W. Bush, and Eugene Fama, an economist at the University of Chicago. Given the broad array of prominent economists on both side of this issue, a careful empirical examination of the stimulus package's effects on labor markets and the economy over is certainly warranted.

The American Recovery and Reinvestment Act (ARRA) (or the “stimulus package”) was passed and signed into law in February 2009 based on the hypothesis that the bill would increase GDP and employment. The estimates range by year, but for 2009 the Congressional Budget Office (CBO) predicted a rise in GDP of between 1.4% and 3.8%, a reduction in unemployment of between 0.5% and 1.3%, and an increase of between 0.8 million and 2.3 million jobs (Congressional Budget Office, 2009). These estimates for 2009 were based on a net increase of the government deficit of \$184 billion and thus a cost of between \$80.4 and \$231.1 thousand for each job created. As of June 24, 2009, \$138.2 billion has been made available and \$40.5 billion has been spent. Therefore, we have begun to analyze the impact of the bill on employment.

Following the release of the 2nd quarter of 2009 GDP estimates in July, other economists have also begun to issue early estimates of the effects of stimulus package on the economy. A cursory examination of the 2nd quarter numbers clearly shows that government spending provided a lift to the economy and both Moody’s and IHS Global Insight estimated that the stimulus “has already saved more than 500,000 jobs.” (Leonhardt, 2009) In remarks to the Economic Club of Washington D.C. on August 6, 2009, Christina D. Romer, Chair of President Obama’s Council of Economic Advisers, suggested that the economic stimulus package had saved 485,000 jobs nationwide and that at the state level there is a strong correlation between each individual state’s employment change over the previous 5 months and ARRA authorized Medicaid Spending by state. (Romer, 2009)

Given the large effects of the stimulus package estimated by economic modeling and simulation, we hypothesize that the effects of the stimulus package should be evident in state level employment data. Taking advantage of state by state variation in stimulus spending, we use a difference-in-difference approach to carry out our analysis. Although the estimation method

has its skeptics, the approach frees of us of specifying a macroeconomic model (the cause of disagreement within the profession). Furthermore, it is easily replicated and interpreted. To date, the results show no correlation between the amount of spending and a change in employment using ordinary least squares as well as two-stage least squares with senator seniority as an instrument.

Results

The observations are taken at the state level. In order to determine whether recent federal outlays impacted the number of jobs, we estimate the correlation between outlays and change in employment using the following equation:

$$\Delta employment_s = \alpha_0 + \alpha_1 outlay_s + \varepsilon_s \quad (1)$$

where s = state. Both variables are scaled by the size of the labor force size in the state.

Seasonally-adjusted employment data from both the Current Population Survey (CPS) and the Current Employment Statistics (CES) survey are available monthly from the Bureau of Labor Statistics. We use the six-month change in employment (January 2009 to June 2009) since outlays began in early 2009. Outlay data are available from the Recovery Accountability and Transparency Board (via <http://www.recovery.gov/>). Our outlay data are cumulative up to June 24th, 2009. We use data on outlays that have been “paid out”, rather than those either “announced” or “made available”, since it is the most likely to impact employment. Table 1 presents summary statistics of the employment and outlay data. Between January and June 2009, the average job loss is roughly 50,000 per state in both surveys, and the average outlay is roughly \$810 million per state. At the CBO’s estimates of \$80-\$231 thousand in stimulus per job created, the money paid out so far should have resulted in measurable employment gains. There

is also a significant amount of variation in employment changes and outlay amount across the states.

Endogeneity is a concern in equation (1) since the direction of causality between employment changes and outlays is not clear. We aim to estimate the impact of outlays on employment changes, but it is possible that politicians disproportionately allocated outlays to high unemployment states. Given the specification of the data in equation (1), our estimate of α_1 is biased if outlay allocations are correlated with the unexplained change in employment. There are two reasons to believe these variables are likely to be uncorrelated. First, it is more likely that outlay allocation decisions were based on the level of employment rather than the expected changes in employment. Second, outlay allocation decisions were made before changes in employment level are known. Putting these facts together, endogeneity of equation (1) requires that politicians made outlay allocation decisions in late 2008 and early 2009 based on their projections of the *change* in employment in the first half of 2009. Again, while Romer (2009) is certainly correct in her charge that “states whose economies are weaker tend to get more of these funds,” since the estimation is performed on changes in employment not the level of unemployment, in order for endogeneity to be an issue it must be the case that states whose economies *were projected to weaken the most over the next 6 months* tended to get more of these funds.

Although endogeneity seems remote, we nevertheless incorporate a two-stage least squares (2SLS) analysis in addition to the basic ordinary least squares (OLS) estimates. We use the total tenure of the state’s senators as an instrument following Boyle and Matheson (2009). The first stage is presented in Table 2 and provides justification for the choice of instrument.

Tables 3 and 4 present the estimation results for the CPS and the CES data, respectively.

The first and third columns of the tables provide estimates for equation (1) using OLS and 2SLS, respectively. The second and fourth columns include a second independent variable: the six-month change of employment between July and December 2008, which is the six-month period prior to our dependent variable. This specification accounts for the trend of employment changes in each state. The final column of Table 2 also confirms that, indeed, states whose economies lost the most jobs in the 6 months prior to the passage of ARRA tended to receive more funding.

The results show that outlays per capita have no statistically significant effect on employment. Indeed, the coefficients on spending are not even of the expected sign in 7 of the 8 specifications. Further, the low r -squared values in all estimations suggest little connection between outlays and employment. Based on these results, we conclude that outlays thus far have had no discernable impact on job creation.

It should be noted that expansionary macroeconomic policies are always subject to lags. In this case, however, the use of “paid out” stimulus funds eliminates at least two of the common lags, the information lag and the implementation lag, as well part of the effect lag, since this is money that has actually been spent. Of course, any multiplier effects cannot be assumed to have fully incorporated into labor market. However, even absent any lagging multiplier effects, the stimulus should have already provided a measurable effect on employment according to the estimates of the CBO and others.

So what is one to make of the early results of this great macroeconomic experiment? As noted by Brad DeLong (2009), “On the theoretical side, it is *very* hard to build a model in which fiscal expansion has no effect on nominal income.” On the other hand, it is much easier to develop simple models in which changes in GDP do not translate into corresponding changes in employment. Indeed, employment during this recession, particular during the 4th quarter of 2008

and the first two quarters of 2009, appears to have dropped far more quickly than would have been predicted based on previous estimates of Okun's Law based on historical data. It is entirely plausible that ARRA has stimulated the GDP without stimulating the labor market. The state level empirical evidence thus far, however, does not support the hypothesis that the stimulus package has had significant positive effects on state labor markets contrary to the estimations of many theoretical models.

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Table 1: Summary Statistics

Variable	Mean (Std. Dev.)	Minimum (State)	Maximum (State)
six-month change in employment (Consumer Survey)	-48,867 -60,301	-319,533 (CA)	12,617 (TX)
six-month change in employment (Payroll Survey)	-52,880 -64,584	-365,800 (CA)	6,200 (ND)
outlays announced (in \$1,000s)	\$4,491,535 <i>(\$4,734,697)</i>	\$606,208 (VT)	\$25,600,000 (CA)
outlays made available (in \$1,000s)	\$2,765,238 <i>(\$3,073,599)</i>	\$348,448 (DE)	\$16,900,000 (CA)
outlays paid out (in \$1,000s)	\$810,385 <i>(\$1,249,640)</i>	\$34,140 (WY)	\$8,221,146 (CA)
Sum of Senator Tenure	24.52 <i>(17.46)</i>	0 (CO)	74 (WV)
<i>scaled by state's labor force</i>			
six-month change in employment/labor force (Consumer Survey)	-0.017 -0.0096	-0.048 (WV)	0.0011 (VT)
six-month change in employment/labor force (Payroll Survey)	-0.016 -0.0084	-0.041 (WY)	0.017 (ND)
outlays announced (in \$1,000s)/labor force	\$1.75 -0.88	\$1.17 (NJ)	\$6.99 (DC)
outlays made available (in \$1,000s)/labor force	\$1.05 -0.71	\$0.64 (NV)	\$5.81 (DC)
outlays paid out (in \$1,000s)/labor force	\$0.25 -0.1	\$0.10 (NE)	\$0.71 (DC)

Note: Both of Colorado's senators began January, 2009.

Table 2: First Stage in Instrumental Variable Approach

Variable	Estimate (Std. Error)	Estimate (Std. Error)
Sum of senator tenure	0.00122* (0.00065)	0.00111* (0.00059)
six-month change in employment between July and December 2008/labor force		-5.35084** (1.56198)
Constant	0.21020** (0.01955)	0.19092** (0.01855)
<i>r</i> -squared	0.06790	0.25410

Dependent Variable: outlays paid out (in \$1000s)/labor force. (** and * denote significance at the 1% and 10% levels, respectively.)

Table 3: Results Using Current Population Survey Employment Data

Variable	OLS Estimates		2SLS Estimates	
	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)
outlays paid out (in \$1000s)/labor force	-0.0044 (0.0132)	0.0065 (0.015)	-0.1231 (0.0954)	-0.1299 (0.1056)
six-month change in employment between July and December 2008/labor force		0.37 (0.23)		-0.4194 (0.6594)
Constant	-0.016** (0.0036)	-0.017** (0.0036)	0.0126 (0.0230)	0.0125 (0.0231)
<i>r</i> -squared	0.0023	0.0545		

Dependent Variable: six-month change in employment between January and June 2009/labor force. (** and * denote significance at the 1% and 10% levels, respectively.)

Table 4: Results Using Current Employment Statistics Payroll Survey Data

Variable	OLS Estimates		2SLS Estimates	
	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)
outlays paid out (in \$1000s)/labor force	-0.011 (0.011)	-0.0086 (0.012)	-0.0092 (0.0561)	-0.0084 (0.0586)
six-month change in employment between July and December 2008/labor force		0.069 (0.14)		0.0667 (0.2422)
Constant	-0.014** (0.0031)	-0.013** (0.0032)	-0.0140 (0.0135)	-0.0134 (0.0117)
<i>r</i> -squared	0.0177	0.0227		

Dependent Variable: six-month change in employment between January and June 2009/labor force (** and * denote significance at the 1% and 10% levels, respectively.)